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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,524	01/27/2004	Tohru Ikeda	00862.023420.	9965

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EXAMINER	
ZHU, RICHARD Z	
ART UNIT	PAPER NUMBER
2625	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/764,524	IKEDA, TOHRU	
	Examiner	Art Unit	
	RICHARD Z. ZHU	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,5,7 and 9-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 4-5, 7, 9-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/16/2009 has been entered.

Response to Applicant's Arguments

2. In re "**As such, Hudson is seen to disclose that each color component is processed. However, Hudson is not seen to disclose or suggest use of an n-dimensional table, or that output data is decided in other areas**";

The n-dimensional table as claimed is described by the specification as a 3D LUT for converting input RGB to output RGB to be interpolated by an interpolator 32. Similarly, ***Hudson*** teaches using a LUT 40 to convert input three-component RGB to a three-component output to be thereafter interpolated into three-component CMY. Therefore, the question is "is LUT 40 a 3D LUT"?

It is generally understood in the art that color spaces can be expressed in device dependent color spaces such as RGB, CMY, or CMYK or device independent Lab, YCbCr, or YUV etc. Regardless of the color space being used, all of the color spaces are expressed in

three dimensional (3D) color axes. In order to perform color transformation from a first color space to a second color space, it is necessary to express input color components along respective color axes in the first color space and to interpolate corresponding lattice points that associates or otherwise best matches the input color components along respective color axes in the second color space (Three Dimensional Input -> Three Dimensional Output). That is, in order for LUT 40 to take RGB data expressed along a RGB 3D axis to generate respective outputs to be interpolated into CMY data expressed along a CMY 3D axis as shown in Fig 4, LUT 40 must be a 3D LUT because only a 3D LUT can express 3 dimensional input color components to corresponding 3 dimensional output color components. Therefore, ***Hudson*** **does indeed disclose the use of an n-dimensional table in the implementation of at least Fig 4**. The examiner does concede the applicant is correct to point out the table of alternative implementation shown in Fig 5 is a 1D LUT since each table is responsible for corresponding color component only.

Further still, error diffusion is understood by the examiner as a type of frequency modulated halftoning in which the size of halftone dots are fixed but the frequency of the dots are varied. It distinguishes over amplitude modulated halftoning in that the distribution of halftone dots are varied in order to compensate for spatial non-uniformity or rather to minimize the difference between the input data and output data by diffusing errors or color differences between a currently input pixel and its corresponding output pixel to surrounding pixels. See ***Samworth (US 6118935 A)*** **(Col 5, Rows 5-15)** and ***Av-Shalom et al. (US 6704123 B1)*** **(Col 9, Row 47 – Col 10, Row 18)**. By applying error diffusion technique in the halftoning process on areas that includes area where cyan and magenta should not be

simultaneously outputted and those that could, ***Hudson*** essentially discloses "decided so as to minimize the difference between the input data and output density data in other areas".

Newly amended limitations discussed in the argument with additional explanations provided by the examiner are presented in the office action below.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1, 4-5, and 10-11 are rejected under 35 USC 101 as directing toward non-statutory subject matter.

Regarding 1, 4-5, and 10-11, Supreme Court precedent [see ***Diamond v. Diehr,* 450 U.S. 175, 184 (1981)**; ***Parkerv. Flook,* 437 U.S. 584, 588 n.9 (1978)**; ***Gottschalk v. Benson,* 409 U.S. 63, 70 (1972)**; ***Cochrane v. Deener,* 94 U.S. 780, 787- 88 (1876)**] and recent Federal Circuit decisions [see ***In re Bilski,* 88 USPQ2d 1385 (Fed. Cir. 2008)**] indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

When the claims are read broadly, as they must be read during the examination process [see ***In re Zletz,* 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)** "claims must be interpreted as broadly as their terms reasonably allow"], the Examiner finds that the steps of *inputting, generating, deciding, calculating, and outputting* are all elements which can be implemented solely in software or algorithms or by a human being with a pencil and a paper. None of the aforementioned steps call for any transformation of an article to a different state or thing nor do they recite any particular machine or apparatus to perform the recited steps and therefore do not recite a statutory process under ***Bilski.***

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 4-5, 7, and 9-11 are rejected under 35 USC 103(a) as being unpatentable over ***Hudson et al (US 6057933 A)*** in view of ***Rozzi (US 6867884 B1)***.

Regarding the Apparatus of Claim 7 therefore Method of Claim 1 and Program of Claim 9, ***Hudson*** discloses an image processing method comprising the steps of and means for:

input means for inputting image data representing an image, the image data having n color components (**Figure 2, Printer 24 and Printer Controller 28. See Col 3, Rows 33-48,**

Printer Controller 28 receives image data from Computer 22. The plurality of color components being RGB, see Col 3, Row 66- Col 4, Row 21);

generating means for generating input data by adding color difference data to the image data (**Col 5, Rows 8-15, Fig 4, summer 50, summing base level error terms with diffused error from nearby cells to be added to base output level to generate final output. Base output level is interpreted as input data**);

deciding means for deciding output data having output color-components for an output device and output density data (**Col 3, Row 66 – Col 4, Row 21, converting input RGB components into halftone processed CMYK output components and Fig 2, output device being printer 24, output density data being base output level + increment on the basis of threshold comparison**), by referring to an n-dimensional table in which a correspondence between the input data and the output data and the output data density is stored (**Fig 4 and see Col 4, Rows 12-20, LUT 40 and Interpolator 41 for converting three dimensional RGB components into three dimensional CMY input components to thereafter generate error diffused three dimensional CMY output components**), based upon the input data, wherein the output density data represents a density of an output image reproduced by the output device based upon the output data (**Fig 4, final output generated at Incrementor 56 represents a density of an output image reproduced by the output device based upon error diffused CMY base output levels**);

calculating means for calculating the color difference data by subtracting the output density data from the input data (**Fig 4, CMY 42 generating base level error term or color difference to be summed with diffused error from nearby cell to generate the total color**

difference between input CMY generated by LUT 40 and Interpolator 41 and final output level CMY);

outputting means for outputting the output data having output color components decided by the deciding means (**Col 5, Rows 44-63 and Fig 4, Incrementor 56 for outputting final output level**);

wherein the output components include a cyan component and a magenta component (**Fig 4, CMYK components**);

and wherein the output data included in the n-dimensional table is decided such that the cyan component and the magenta component are not simultaneously output by the output device in an area where a density of the cyan component and a density of the magenta component could cause graininess (**Col 6, Row 42 - Col 7, Row 5, preventing simultaneous output of cyan and magenta in a certain cell**), and is decided so as to minimize the difference between the input data and the output density data in other areas (**Fig 4, Rows 30-40, the point of error diffusion is to generated an uniform halftoned output that most resemble the original continuous tone input. Furthermore, if the combined error term does not exceed the threshold at 52, no increment is added to base output level or input data and therefore the final output level or output density is equal to base output level or the difference there between is minimized**).

Hudson does not disclose such that the cyan component and the magenta component are not simultaneously output by the output device in an area where a density of the cyan component and a density of the magenta component are low.

Rozzi discloses that for CMYK printers, graininess is often present in the highlight areas or areas of low color component density due to overprinted cyan and magenta dots (**Col 2, Rows 59-67**).

Therefore, it would've been obvious to one of ordinary skill in the art at the time of the invention to understand area with graininess of ***Hudson*** in view of ***Rozzi*** to be an area where a density of cyan and magenta component are low in order to utilize the deciding step of ***Hudson*** to prevent simultaneous output of cyan and magenta component that would result in a conspicuous blue dot in said highlighted area where a density of cyan and magenta component are low.

With respect to the computer program reside upon a statutory computer readable medium, ***Hudson*** discloses a control program for causing a computer to execute the image processing method (**Col 3, Rows 33-48, software to implement image processing method**) and a computer readable medium on which the program set forth has been recorded (**Col 3, Rows 33-48, software being located in computer 22**).

Regarding Claim 4, ***Hudson*** discloses wherein the output data having output color-components are decided based upon quality of printing required (**Col 3, Rows 35-40 and Col 4, Rows 60-63 and Col 6, Rows 40-45, overprinting of cyan and magenta is decided against to prevent graininess or to enhance quality of printing as required**).

Regarding Claim 5, ***Hudson*** discloses wherein the output data having the output color components is decided based graininess (**Col 6, Rows 40-45**).

Hudson does not disclose it is decided based on characteristics of printing media.

Rozzi discloses that graininess is caused by high contrast between the paper and over printed cyan and magenta dots or black dots (**Col 2, Rows 6-65**).

One of ordinary skill in the art would've understood that the decision to prevent simultaneous output of cyan and magenta on the basis of graininess is base upon the problem of high contrast between paper and overprinted cyan and magenta dots or characteristics of printing media.

Regarding Claim 10, ***Hudson*** discloses wherein the n-dimensional table includes a first table in which a correspondence between the input data having the n color components and the output data having the output color components (**Fig 4, LUT 40 for converting three dimensional RGB component into a format suitable for interpolator 41 to generate corresponding best match three dimensional CMY component**), and a second table in which a correspondence between the input data having the n color components and the output density data having the n color components (**Fig 4, CMY 42 and see Col 4, Rows 30-35, to generate base CMY output levels via LUT 42 to thereafter generate final output density data via incrementor 56**).

Regarding Claim 11, ***Hudson*** discloses wherein the n color components differs in a type from the output color components (**Fig 4, RGB components are different from CMY components**).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Richard Z. Zhu whose telephone number is 571-270-1587 or examiner's supervisor King Y. Poon whose telephone number is 571-272-7440. Examiner Richard Zhu can normally be reached on Monday through Thursday, 6:30 - 5:00.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RZ^2
01/22/2008

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